Getting Started with RealEncoder®

Version 5.0

RealNetworks, Inc.

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1. Introducing RealEncoder

RealEncoder is a powerful tool that makes it possible for you to create audio and video content for your Web site.

Your audio and video can be placed on your Web site for on-demand access by end users, broadcast live over a network, or simultaneously broadcast live and stored as a file for later use.

RealEncoder is a fast and easy way to put streaming RealAudio and RealVideo on your Web pages. With RealEncoder you can deliver streaming audio and video even without a RealServer by streaming from a standard Web server. Whether you use ReaEncoder to demonstrate your company's products, broadcast your CEO’s speech, or show home videos over the Web, it's easy and fun.

1.1 What RealEncoder does

Streaming is the latest technology for audio and video available today and allows audio or video clips to play as soon as they start being received by your computer. This means you don’t have to wait while a file downloads before it plays.

RealEncoder enables:

- streaming audio and video for reliable transmission under real-life conditions
- a variety of encoding template options, including multiple-template encoding and bandwidth negotiation for

For more advanced applications, RealEncoder delivers:

- interactivity
- flexibility to move beyond passive viewing to an enhanced, user-controlled multimedia experience

1.2 Basic steps to adding streaming media to your Web site

1. Select audio and video content from a variety of sources:
    - pre-existing audio and video files, including .wav, .avi and .mov file formats
    - live sources such as video cameras, microphones, audiotape, videotape and satellite feeds
2. Compress, or encode, your source audio and video to create RealAudio and RealVideo files in several ways:
    - pre-defined templates that automatically calculate audio and video bandwidth options for the modem connection delivering your content
    - multiple templates that deliver content over different modem connections from a single Web page link
    - customized templates for the particular type of audio or video you are encoding together with the available bandwidth.

1.3 About this guide

Chapter 1 introduces RealEncoder, explains what it does, and outlines the basic steps for adding streaming media to your Web site.

Chapter 2 explains installation procedures for Windows platforms, either from the download location at the RealNetworks Web site or from the RealServer CD-ROM.

Chapter 3 provides information about system requirements for installing and using RealEncoder, including minimum and recommended requirements.

Chapter 4 explains bandwidth, encoding templates, source files for static encoding, static and live encoding of audio or video files, and multi-template encoding.

Chapter 5 provides tips for enhancing RealEncoder's performance, creating bandwidth negotiated files, altering image size, controlling volume, monitoring audio levels and encoding statistics, and editing your media files.

1.4 Creating and delivering RealAudio and RealVideo

RealEncoder creates on-demand content that users can access whenever they choose and can be created in all screen sizes. It can be played from standard Web servers or from a streaming media server from RealNetworks for higher reliability. Live audio and video require a RealServer streaming media server.

With RealEncoder you can choose to deliver a range of performance through ordinary modem connections all the way to corporate Intranet LANs. You can also maximize the available bandwidth to meet the demands of the content, for example, a music video requires different emphasis than a simple speech.

2. Installing RealEncoder

Installing RealEncoder is quick and easy. You can download RealEncoder from the RealNetworks Web site or install it from a RealServer CD-ROM. The installation procedure below is for the Windows platform.

To download and install the program from the Intenet:

1. With a Web browser, go to the RealNetworks Web site:

   http://www.real.com

2. Go to the RealSystem 5.0 Products page, then to the RealEncoder 5.0 download page to download the installer.

3. When prompted, click the **Save to Disk** button and specify a temporary directory for the installation program. Note where you saved it.

4. In File Manager or Explorer, double-click the installation icon in the temporary directory to activate the automated installation process.

To install RealEncoder setup program from CD-ROM:

1. Insert the CD-ROM into the drive.

2. In File Manager or Explorer, double-click **renc50.exe** in the **\Encoders** directory of the CD-ROM to activate the automated installation process.

To complete the installation of the encoder:

1. Close any other applications that may be open and click **Next**.

2. To accept the terms and conditions for installing the Encoder, click **Next**.

3. Enter your name, company or organization name, and e-mail address. Then click **Next**.

4. To install the encoder into the default directory, click **Next**. If you wish to install the encoder in a different location, click **Browse** and select the directory into which you want it to be installed.

5. If you are installing over an existing RealVideo Encoder, RealAudio Encoder or RealEncoder for which you have defined custom templates,

select **Keep Existing Templates** if you want to preserve your custom templates.

6. To finish the installation, click **Finish**.

7. Click **OK**.

3. System Requirements

This section outlines the basic hardware and software requirements to create RealAudio and RealVideo content. It contains information about the technical specifications for static encoding, used for creating on-demand content, and instructions for live encoding which enables real-time live broadcasting. RealAudio content consists of audio only. RealVideo consists of audio and video or video only.

RealEncoder is available for the following platforms:

- Windows 95 (static and live encoding)
- Windows NT 3.5 and 4.0 (static and live encoding)
- Macintosh (static encoding only)

3.1 Windows 95 and Windows NT system requirements

3.1.1. Static and live encoding RealAudio for Windows 95/NT

Different hardware is required for encoding an audio file and encoding a live audio stream.

Requirement	Static Encoding	Live Encoding
CPU	486/66 DX	Pentium 586, 75MHz
RAM	8MB	8MB required, 16MB recommended

Requirement	Static Encoding	Live Encoding
Hard Disk Space (software)	1MB	1MB
Sound Card	16-bit sound card or better	

3.1.2 Static encoding RealVideo for Windows 95/NT

Requirement	Minimum	Recommended
CPU	486/66 DX	Pentium 120
RAM	16MB	6MB
Hard Disk space (software)	4MB	4MB
Hard Disk space (data)	500MB	1GB
Color Display	16-bit	24-bit (TrueColor)
Video Capture Card*	Any quality capture card which can produce .avi or .mov files	
Sound Card*	16-bit sound card or better	

* Video and sound cards are needed only for capture-to-file encoding and are not necessary for encoding of pre-existing AVI or QuickTime files. See the “Tips and Tricks” section for more information on capture-to-file encoding.

3.1.3 Live encoding RealVideo for Windows 95/NT

Live capture and live encoding uses content from a variety of sources:

- VHS, S-VHS or Beta-SP tape
- live video camera and microphones
- any other analog video or audio source

High quality live encoding takes longer and requires greater computer power than lower quality. Here are the minimum and recommended requirements for encoding at low and high frame rates.

Requirement	**Low Frame Rate (less than 3 fps)**	**High Frame Rate (more than 3 fps)**	**Recommended for High Frame Rate or Large Screen Sizes**
OS	Windows 95	Windows NT	
Computer	Pentium 166 MHz	Pentium 200 MHz	Dual Pentium 2
RAM	32MB	64MB	
Hard Drive	1GB	1GB	
Color Display	16-bit	24-bit (TrueColor)	
Video Capture Card	Any native VFW capable capture card	Osprey 100, Osprey 1000	
Sound Card	16-bit sound card or better	16-bit sound card or better	

Note: Slower machines also give reasonable results in Slide Show mode, at 1fps or less.

3.2 Macintosh system requirements

For Macintosh users, RealEncoder supports only static encoding for video and audio. It does not support live video or audio encoding.

3.2.1 Static encoding RealAudio and RealVideo for Macintosh

Requirement	Minimum	Maximum
CPU	Any PowerPC	604 PowerPC
RAM	16MB	32MB
Hard Disk space (software)	4MB	4MB
Hard Disk space (data)	500MB	1GB
Operating System	System 7.5.5	System 8.0

Note: RAM requirements may be slightly different for RealAudio and RealVideo.

4. Using RealEncoder

This chapter provides step-by-step instructions for two types of encoding: static encoding of pre-existing audio and video files and live encoding for broadcasting or archival purposes.

To help you get started, RealNetworks has supplied various templates that help you determine the appropriate settings for different types of audio and video input. Each template is optimized for a particular type of audio and video content as well as for bandwidth.

4.1 Bandwidth

Bandwidth, also known as bit rate, is the amount of data that can be received by your modem during a set period of time. Bandwidth is measured in kilobits per second (Kbps). Standard modems are commonly referred to by the bit-rate they are able to receive, for example, 14.4, 28.8, and 56 Kbps. These designations may already be familiar to you.

In addition to standard bandwidths, you can encode clips for bit-rates up to 500 Kbps. These higher bandwidths, however, are generally more typical of corporate intranets or entertainment-based web sites.

Keep in mind that the bandwidth the connection is capable of is greater than the average bandwidth carried across it. For that reason, the templates for 28.8 Kbps connections actually only require about 20 Kbps, while a 56 Kbps connection template actually uses about 36 Kbps.

4.2 Encoding templates

You can select a pre-defined encoding template or design a template specifically for the type of audio or video you are encoding. An encoding template allows you to specify bandwidth options for your content, whether for audio only, video only, or audio and video.

RealEncoder comes with pre-defined templates that enable you to encode your content specifically for your target audience, optimized for the content type your are encoding. For more information on templates, refer to the “Tips and Tricks” section.

4.3 Source files for static encoding

RealAudio and RealVideo clips may be created from previously captured digital audio or video files. The following video formats are supported:

- Video for Windows (.avi). RealEncoder accepts compressed or uncompressed formats, although it is recommended you use uncompressed formats whenever possible.
- QuickTime for Windows and Macintosh (.mov).

  On **Windows** platforms, only uncompressed files are supported.

  For **Macintosh** platforms, uncompressed files are supported . Compressed Cinepak files and Apple’s Video Compressor are supported. However, it is recommended you use uncompressed formats whenever possible.

The following audio formats are supported by RealEncoder. It is recommended that you use uncompressed files whenever possible:

For **Windows**:

- Waveform (.wav). RealEncoder accepts compressed or uncompressed formats, although it is recommended you use uncompressed files.
- QuickTime for Windows (.mov)
- Audio (.au)
- Sound (.snd)

For **Macintosh**:

- Audio Interchange (.aif)

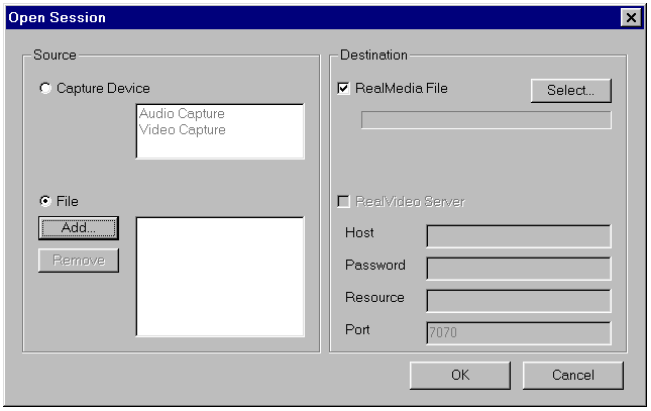
- Waveform (.wav)
- QuickTime for Macintosh (.mov)
- Audio (.au)
- Sound (.snd)

4.4 Encoding RealAudio or RealVideo files for Windows

To create a RealAudio or RealVideo file from an existing audio or video file using RealEncoder for Windows:

1. Start **RealEncoder**. The RealEncoder window opens:

2. Click **Open Session** from the File menu. The Open Session window appears:



3. In the source pane, verify that **File** is selected.

4. Click **Add**. The Add Source File dialog box appears.

5. Select the file you want to encode. Click **Open**.

6. In the destination pane, verify **RealMedia File** is checked.

7. Click **Save As**. The Select Destination File dialog box appears.

8. Choose a directory to store the file and enter the destination file name.

9. Click **Save**.

10. Click **OK**. The Open Session window closes.

11. In the properties pane, you can enter the Title, Author, and Copyright information for your output file. These fields are optional.

12. Click **Mobile Playback** if you wish to create content that can be downloaded by RealPlayers and transferred to Mobile Players such as the Audible Player for time-shifted playback.

    The Audible Player currently supports the 6.5 Kbps voice codec that is available as part of RealEncoder 5.0. Contact your Mobile Playback vendor if you need more information.

13. If you wish RealPlayer and RealPlayer Plus users to be able to save your RealVideo or RealAudio signal to disk, click **Selective Record**.

14. In the encoding templates list box, select the template for the target audience you want your file to play for.

    It is recommended that you use the default setting for **Optimized Frame Rate when** using pre-defined templates. Refer to the "Tips and Tricks" section for more information on encoding templates.

15. Click **Start** to begin the encoding process. When encoding is complete, an Encoding Complete message appears indicating the bit rate the file was encoded at.

    If RealEncoder is unable to encode the file at the selected bit rate, you may need to re-encode the file with a different template. To edit your template settings, click **Advanced** and re-encode your file with the updated template.

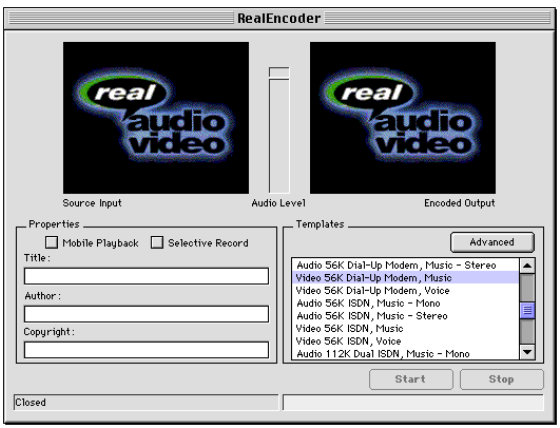
    For more information about creating and editing templates, see p. 36 under "Tips and Tricks."

16. View the encoded file with RealPlayer.

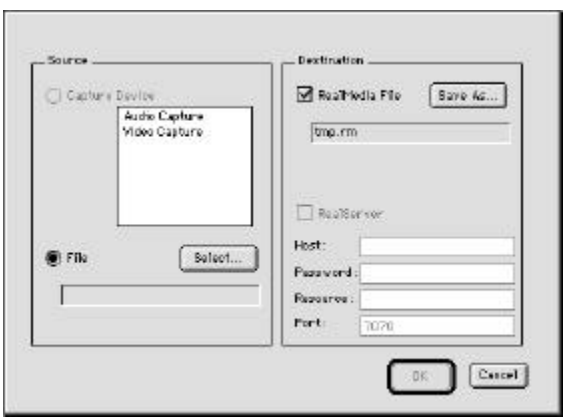
4.5 Encoding RealAudio or RealVideo files for Macintosh

To create a RealAudio or RealVideo file from an existing audio or video file using RealEncoder on Macintosh:

1. Start **RealEncoder**. The RealEncoder window opens:



2. Click **Open Session** from the File menu. The Open Session window appears:



3. In the source pane, verify that **File** is selected.

4. Click **Add**. The Add Source File dialog box appears.

5. Select the file you want to encode. Click **Open**. The Add Source File dialog box closes.

6. In the destination pane, verify **RealMedia File** is checked.

7. Click **Save As**. The Select Destination File dialog box appears.

8. Choose a directory to store the file and enter the destination file name.

9. Click **Save**.

10. Click **OK**. The Open Session window closes.

    Note: The Capture Device and RealServer options in the Open Session window are for live encoding and are not available for Macintosh users.

11. In the properties pane of the RealEncoder window, you can enter the Title, Author, and Copyright information for your output file. These fields are optional.

12. Click **Mobile Playback** if you wish to create content that can be downloaded by RealPlayers and transferred to Mobile Players such as the Audible Player for time-shifted playback.

    The Audible Player currently supports the 6.5 Kbps voice codec that is available as part of the RealEncoder 5.0. Contact your Mobile Playback vendor if you need more information.

13. If you wish RealPlayer and RealPlayer Plus users to be able to save your RealVideo or RealAudio signal to disk, click **Selective Record**.

14. In the encoding templates list box, select the template for the target audience you want your file to play for.

15. Click **Start** to begin the encoding process. When encoding is complete, an Encoding Complete message appears indicating the bit rate the file was encoded at.

    If RealEncoder is unable to encode the file at the selected bit rate, you may need to re-encode the file with a different template. To edit your template settings, click **Advanced** and re-encode your file with the updated template.

16. View the encoded file with RealPlayer.

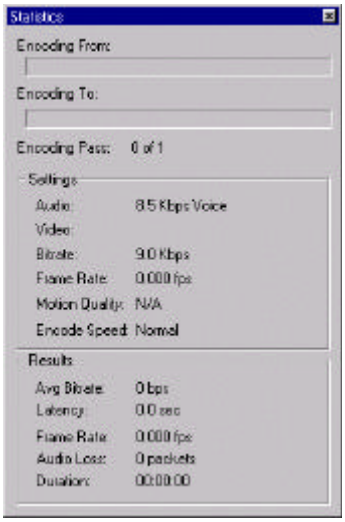
4.6 Encoding live audio or video

To encode and broadcast live audio or video using RealEncoder:

1. Start RealEncoder. The RealEncoder window opens.
2. Click **Open Session** from the File menu. The Open Session window appears:
3. In the source pane, verify that **Capture Device** is selected.
4. Click **Audio Capture** for audio only or select **Audio Capture** and **Video Capture** for video with audio.
5. In the destination pane, click **RealServer**.
6. While performing a live broadcast you can archive the event by also selecting **Destination RealMedia File** from the Open Session window.
7. Enter either the domain name or the IP address of the RealServer streaming media server computer.
8. Enter your password. This field is optional depending on how your RealServer is set up.
9. Enter the resource name, which is the name you give to the audio or video stream being encoded and which users will refer to.
10. Click **OK**. The Open Session window closes.
11. In the properties pane, enter the Title, Author, and Copyright information for your output stream. These fields are optional. If you choose to provide this information, it will be displayed on the viewer's Real Player.
12. To allow RealPlayer Plus users to save your Real Audio or RealVideo content to disk, click **Selective Record**.

13. In the templates pane, select the template to encode the file. For more information on templates and creating your own templates , refer to “Tips and Tricks” in Chapter 6.

14. Select **Statistics** from the View menu. The Statistics window appears. The information displayed in this window during broadcast will help you evaluate and adjust your template settings.



1. The audio level meter, view input video window and view output window can be turned off to marginally increase performance. These are particularly important for low-bandwidth high-action video clips. From the View menu, click **Show Source Input**, **Show Encoded Output**, and **Show Audio Meter** to clear the selection.

   Turning off **Show Source Input** affects the display whether or not the live feed is being encoded.

2. For video encoding only, notice **Frame Rate** in the Results pane of the Statistics window. Wait while enough data is collected for an average frame rate to be determined. If the average frame rate is below the frame rate set in your template, adjust the encoding by varying one of the five variables. See information about templates in Chapter 5, the “Tips and Tricks” section.

3. For video encoding only, notice **Latency** in the results pane of the Statistics window. If latency is greater than 5 or 10 seconds, adjust the template.

   A high latency will cause a high preroll before playback over the Internet. This causes the player wait for a while before starting to play the clip, so that it does not run out of information in the middle of a clip.

4. For video encoding only, use **Set Video Format** from the Options menu to adjust video format settings for live video-capture content. These options differ by manufacturer and model of the video capture card installed, so consult the appropriate documentation for more information.

5. Click **OK** to accept the current settings.

6. Click **Start** and monitor the progress of the encoding.

7. Listening and viewing the live content through a Web browser is strongly recommended to monitor the end result.

4.7 Multi-template encoding

With multiple templates, you can reach the widest possible audience while still providing high-bandwidth users with the best listening and viewing experience. Multiple templates will create several copies of the streams, optimized for different connection speeds. For example, you can provide optimal sound for both a 28Kbps connection and a 56Kbps connection, and RealPlayer will automatically use the correct stream.

The 56Kbps connection will sound better than the 28Kbps, because of the extra bits. However, the 28Kbps connection has fewer time-outs for rebuffering than the 56Kbps stream.

Using the multi-template encoding feature will also increase efficiency, because you can select all the templates at the same time. They are then encoded automatically.

To encode multiple templates:

1. In the list of templates, select one or more templates by holding down the Control key as you click each template name.

2. Click **Start** to begin multi-template encoding.

3. The Multi-Template Encoding dialog box appears.

   If you are creating bandwidth negotiated files select **Bandwidth Negotiation**, otherwise leave this box unselected. For more information on creating bandwidth negotiated files see the "Bandwidth Negotiation" section of the "Tip and Tricks" chapter of this guide.

4. The Multiple Template Encoding dialog box appears.

   Each template should be a different data rate, for example a 28 Kbps template, a 56 Kbps template and a 200 Kbps template.

5. Click **Begin**. The encoding process starts.

   The Multiple Templates dialog box will remain visible during encoding, and you will be able to monitor audio levels.

6. Click **OK** when the "Encoding Complete" message appears.

7. You will not be able to preview the bandwidth negotiated files until the directory containing the files is posted on a RealNetworks RealServer. If you encoded them as individual files, you may now view them with the RealPlayer.

5. Tips and Tricks

RealEncoder allows you to convert audio and video, whether in common file formats or live inputs, into RealVideo and RealAudio formats. These formats are highly compressed to deliver the best possible sound and video over a limited-bandwidth connection.

Because there is no single best format for delivering audio and video, RealEncoder provides several formats that are optimized differently for different kinds of content.

You can also choose to provide a clip in more than one format based on the type of content and the available bandwidth. For example, you would use a different format to deliver a speech over a 14.4 Kbps modem than you would to deliver a music video over an ISDN connection. You would also use a different format for music over a 14.4Kbps modem from music over a T1 line, to enable the best sound without breaking up at each speed.

5.1 Encoding templates

5.1.1 Choosing templates

Before you begin encoding, you must make decisions about the appropriate settings for different types of audio and video input. RealEncoder supplies several easy-to use encoding templates to assist users in making those decisions without having to know how to use the advanced settings. You can also edit these templates or define a new template for the type of content you are encoding.

5.1.2 Pre-defined templates

Each pre-defined encoding template is optimized for a particular type of audio and video content as well as for bandwidth. Select a template that best suit your

needs. RealEncoder also allows you to encode files using more than one template. See the “Multi-Template Encoding” section of the “Using RealEncoder” chapter for more information on multiple templates.

Template Name	Audio Codec	Video Bit Rate (Kbps)	Total Bit Rate (Kbps)	Video Frame Rate
Audio 14.4, Voice	8.5 Kbps Voice	0.0	8.5	
Audio 28.8, Music – Mono	16 Kbps Music - High Response	0.0	16	
Audio 28.8, Voice	16 Kbps Voice - Wideband	0.0	16	
Audio 28.8, Music – Stereo	20 Kbps Music Stereo	0.0	20	
Video 28.8, High Action	6.5 Kbps Voice	13.5	20	Optimal Sharp
Video 28.8, Slide Show *	12 Kbps Music	8.0	20	.25
Video 28.8, Talking Heads	5Kbps Voice	13.5	20	Optimal Smooth
Audio 56K Dial-Up Modem, Music - Mono	32Kbps Music Mono	0.0	32	

Template Name	Audio Codec	Video Bit Rate (Kbps)	Total Bit Rate (Kbps)	Video Frame Rate
Audio 56K Dial-Up Modem, Music - Stereo	32 Kbps Music Stereo	0.0	32	
Video 56K Dial-Up Modem, Music	12 Kbps Music	22.0	34	Optimal Smooth
Video 56K Dial-Up Modem, Voice	6.5 Kbps Voice	27.5	34	Optimal Smooth
Audio 56K ISDN, Music – Mono	40 Kbps Music Mono	0.0	40	
Audio 56K ISDN, Music – Stereo	40 Kbps Music - Stereo	0.0	40	
Video 56K ISDN, Music	16 Kbps Music - High Response	29.0	45	Optimal Smooth
Video 56K ISDN, Voice	8.5 Kbps Voice	36.5	45	Optimal Smooth
Audio 112K, Dual ISDN, Music - Mono	80 Kbps Music Mono	0.0	80	

Template Name	Audio Codec	Video Bit Rate (Kbps)	Total Bit Rate (Kbps)	Video Frame Rate
Audio 112K, Dual ISDN, Music - Stereo	80 Kbps Music - Stereo	0.0	80	
Video 112K Dual ISDN, Music	16 Kbps Music - High Response	64.0	80	Optimal Normal
Video 112K Dual ISDN, Voice	16 Kbps Voice - Wideband	64.0	80	Optimal Normal
Video High-Bite Rate 200K, Music	16 Kbps Music - High Response	184.0	200	Optimal Normal
Video High-Bite Rate 200K, Voice	16 Kbps Voice - Wideband	184.0	200	Optimal Normal
Video High-Bite Rate 300K, Music	16 Kbps Music - High Response	284.0	300	Optimal Normal
Video High-Bite Rate 300K, Voice	16 Kbps Voice - Wideband	284.0	300	Optimal Normal

Notice that the total bit rate is a combination of the audio codec and the video bit rate. The total bit rate for each template is slightly less than the total bit rate of the bandwidth of the connection.

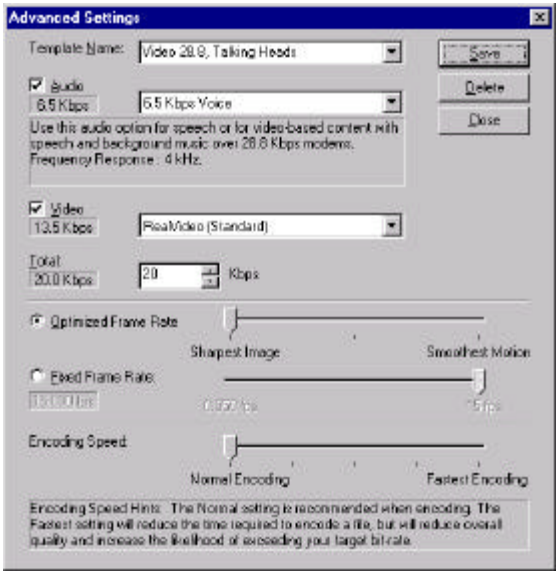
It is recommended that if you want to change some of the settings, save the template as a new template to avoid overwriting the pre-defined template.

6.1.3 Creating new templates

Each audio-only template is comprised of an audio codec. Each video template is comprised of an audio codec, video bit rate, total bit rate, frame rate, and encoding speed. The quality of encoded output is affected by these and by the actual media contents, such as fixed camera shots, more or less motion, and multiple camera shots. If one of the templates does not achieve the effect you are looking for, try creating a new template by basing it on a pre-defined template and then modifying the settings.

To create a new template for Windows:

1. In the templates pane, click **Advanced**. The Advanced Setting window appears:



2. Enter the name of the new template in the Template Name field and click **Save**.

You should not directly modify the pre-defined templates. If you want to change some of the settings of a pre-defined template, save it as a new template by giving it a new name. This way you don't overwrite the pre-defined templates.

3. Select an audio codec. They are arranged by data rate and type of content.

4. Select a Video codec. RealPublisher has two video codecs available, RealVideo (Standard) and RealVideo (Fractal).

5. Select the total bit rate for the entire encoded file. The video bit rate will be total bit rate less the audio bit rate.

   You should reduce the expected total bit rate by 25% to compensate for connection and packet overhead. For example, choose 20 Kbps for a 28.8 Kbps modem.

6. Choose **Optimize Frame Rate**. This lets the encoder adjust the frame rate.

   You can select Optimized Frame Rate when using the RealVideo (Standard) codec. Optimized Frame Rate provides constant image clarity, or sharpness, and variable frame rates. When this option is selected, the encoder automatically selects the frame rate.

   For example, if a person who is talking begins to gesture or move around quickly, the frame rate increases as the motion speeds up and decreases as the motion slows down. The image sharpness remains constant throughout.

   Fixed Frame Rate is adjusted by moving the slider. Fixed Frame Rate gives you the option of choosing to emphasize image clarity or motion smoothness.

   For example, if your content contains a lot of motion, set the slider closer to the 15 fps setting. The resulting video image will be less clear but will exhibit smoother motion, i.e., more frames per second.

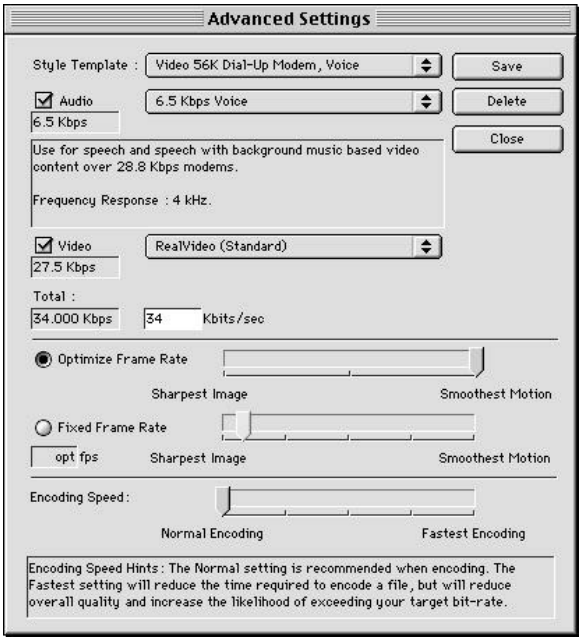
   However, if your content has less motion, set the slider closer to the .050 fps setting. The resulting video images will be more clear but will exhibit less smooth motion, i.e. fewer frames per second.

7. Click **Save** to save the template.

8. Click **Close** to close the Advanced Settings window.

To create a new template for Macintosh: :

1. In the templates pane, click **Advanced**. The Advanced Setting window appears:



2. From the Templates pop-up listbox, select **Custom**.

3. Select an audio codec. They are arranged by data rate and type of content.

4. Select a Video codec. RealPublisher has two video codecs available, RealVideo (Standard) and RealVideo (Fractal).

5. Select the total bit rate for the entire encoded file. The video bit rate will be total bit rate less the audio bit rate.

6. Once you have selected your settings, the Template Name window appears.

7. Enter the name of the new template in the Template Name field and click **OK**.

   You should not directly modify the pre-defined templates. If you want to change some of the settings of a pre-defined template, save it as a new

template by giving it a new name. This way you don't overwrite the pre-defined templates.

You should reduce the expected total bit rate by 25% to compensate for connection and packet overhead. For example, choose 20 Kbps for a 28.8 Kbps modem.

8. Click Choose **Optimize Frame Rate**. This lets the encoder adjust the frame rate.

   You can select Optimized Frame Rate when using the RealVideo (Standard) codec. Optimized Frame Rate provides constant image clarity, or sharpness, and variable frame rates. When this option is selected, the encoder automatically selects the frame rate.

   For example, if a person who is talking begins to gesture or move around quickly, the frame rate increases as the motion speeds up and decreases as the motion slows down. The image sharpness remains constant throughout.

   Fixed Frame Rate is adjusted by moving the slider. Fixed Frame Rate gives you the option of choosing to emphasize image clarity or motion smoothness.

   For example, if your content contains a lot of motion, set the slider closer to the 15 fps setting. The resulting video image will be less clear but will exhibit smoother motion, i.e., more frames per second.

   However, if your content has less motion, set the slider closer to the .050 fps setting. The resulting video images will be more clear but will exhibit less smooth motion, i.e. fewer frames per second.

9. Click **Save** to save the template.

10. Click **Close** to close the Advanced Settings window.

6.1.4 Creating bandwidth negotiation files

Using Bandwidth Negotiation, you can provide the user with the best quality the connection can handle without the user having to explicitly choose among multiple templates. The process is transparent to users, and you can configure your site to automatically serve the appropriately encoded file.

You can encode your files with different compression rates based on the bandwidth capability of the user. You can choose to provide as many different data rates for each file as you want.

To provide content in multiple formats without bandwidth negotiation , your web site must have a separate hypertext link and web page for each format or template. An advantage to bandwidth negotiation is that it requires only one link on your web site to a particular clip.

See the RealAudio and RealVideo Content Creation Guide for more information.

To create a web page that uses Bandwidth Negotiation option:

1. Start **RealEncoder** from your desktop and follow steps 1-13 for encoding audio and video files. See the “Encoding RealAudio or RealVideo Files” section in the “Using RealEncoder” chapter.

2. In the encoding templates listbox, select one or more templates by holding down the Control key as you click each template name.

3. Click **Start** to begin multi-template template encoding.

4. Typically, each template should be a different data rate. For example you might choose a 28Kbps template, a 56 Kbps template and a 200 Kbps template.

5. The Multiple Template Encoding dialog box appears. Verify that Enable **Bandwidth Negotiation** is selected. The files will automatically be named for the server.

6. Follow steps 15-16 for encoding audio and video files. See the “Encoding RealAudio or RealVideo Files” section in the “Using RealEncoder” chapter.

7. Click **Begin**. The encoding process starts.

   The Multi-Template dialog box will remain visible during encoding, and you will be able to monitor audio levels.

8. Click **OK** when Encoding Complete message appears.

9. You will not be able to preview the files until the directory containing the files is posted on a RealNetworks RealServer.

5.2 Performance improvement tips

RealPublisher has several features that allow you to improve performance and increase efficiency.

5.2.1 Turn off audio level meter, view input window, view output window options

By turning off the Show Source Input, Show Encoded Output and Show Audio Meter options, you can increase the frame rate and decrease the time it takes to encode your clip.

5.2.2 Live capture-to-file

If you have a real-time capture station, you can use it to capture and compress directly into RealVideo format. To do this, use the output of a video player and set the encoder to capture-to-file instead of capture-to-a -live server feed. This has the advantage of eliminating the need to create and store intermediate AVI files which are very large and take considerable disk space. It is also the fastest way to capture content like breaking news clips when time-to-post is important.

5.2.3 Drag-and-drop encoding for Windows

RealEncoder supports drag-and-drop encoding.

- Click a video input file icon and drag it onto an open RealEncoder window. This opens a session with path and file name information entered appropriately. Then you only need to enter descriptive information (title, author, and copyright) and customize encoding settings before clicking **Start**.

5.3 Producing high quality video

5.3.1 AVI requirements:

- AVI files should have a 24-bit color depth
- The standard video frame size for the Internet is 176 x 128
- File should be uncompressed for best results
- Indeo drivers must be installed on your machine for the encoder to be able to open .avi files created with the YUV9 format. The Indeo drivers are available from the Intel web site (**www.indeo.com)**. However, if you captured an AVI on the same machine as RealEncoder, the encoder typically has no problem opening it.

5.3.2 QuickTime requirements:

- 24-bit RGB QuickTime video files
- 8- 16-bit mono and stereo audio
- Files must be uncompressed

5.3.3 External audio and video sources

When using external audio and video sources, you must start with the best possible quality. In particular, different video formats yield different qualities when captured (digitized). Additionally, video playback devices commonly have two types of video outputs, S-video and composite. S-video produces better results.

The common video formats in order of quality are:

- Betacam-SP, also known simply as Beta. This format is common among video production professional.

- Laserdisc
- S-VHS or Super-VHS
- VHS

5.4 Producing high quality audio

- Use high quality source files or recording input device.
- If you are not doing a live broadcast, capture or “digitize” the sound to a supported file format such as a .wav, mov, or .aif whenever possible.
- Digitizing the sound before encoding the file allows you to use a sound editor to adjust the amplitude of your signal to maximize the available dynamic range. If you do not adjust the signal, the resulting RealAudio and RealVideo files may sound flat.
- If your original audio file signal exceeds the acceptable amplitude range, the file may be “clipped.” Clipping can give rise to clicks or pops on playback. If your source file contains a clipped signal, your final RealAudio or RealVideo file will have high-frequency background noise or static. Lowering the input volume will help reduce clipping.
- Eliminate any DC offset either while recording or later with an audio editor. This removes low frequency noise.
- When encoding live-source audio, you have less opportunity to manipulate your input signal. Be sure that volume levels are prepared and tested before encoding.
- Cut any unnecessarily long silences from the beginning or end of the output file to conserve space.

5.4.2 Encoding with multiple codecs

Use a CD quality sampling rate (44.1 kHz), sampling width (16-bit), and two channels when creating an input file that you intend to encode using multiple audio codecs. Stereo audio codecs will not encode mono audio input.

5.4.3 Synchronizing audio and video

To ensure that the audio stays synchronized with video or other time critical media, use the following sampling rates for your source audio:

Codec	Sampling Rate
14.4	8, 16 or 32 kHz
5 Kbps voice	8, 16, 32 kHz
6.5 Kbps voice	8, 16 or 32 kHz
8.5 Kbps voice	8, 16 or 32 kHz
15.2 Kbps voice	8, 16 or 32 kHz
16 Kbps voice	16 or 32 kHz
8 Kbps music	8, 16 or 32 kHz
12 Kbps music	8, 16 or 32 kHz
16 Kbps music High response	11.025, 22.05 or 44.1 kHz
16 Kbps music Med response	11.025, 22.05 or 44.1 kHz
16 Kbps music Low response	8, 16 or 32 kHz
20 Kbps music stereo	8, 16 or 32 kHz
40 Kbps music mono	11.025*, 22.05 or 44.1 kHz
40 Kbps music stereo	8*, 16 or 32 kHz
80 Kbps music mono	11.025*, 22.05* or 44.1 kHz
80 Kbps music stereo	8*, 16* or 32 kHz

* The sample rates are lower than the default input rates of the encoder. For fuller sound, it is recommended you use the higher sampling rates.

5.4.4 Using the audio level meter

While you encode RealAudio or RealVideo you can monitor the audio input level to be sure you are encoding the optimal dynamic range. Green indicates a normal reading. Red warns that you are close to an over-modulated input. The

best sound quality will occur when the top red bar is often lit but the clipping indicator never goes off.

5.5 Image size

RealEncoder supports any size image that is divisible by 15. The most common sizes are 176 x 128 pixels or 320 x 240 pixels. An image size of 160 x 120 is also supported. Live capture image size is controlled through **Set Video Format** under the Options menu, and is dependent upon the video capture hardware installed.

5.6 Image cropping

1. To encode only part of the screen, select **Crop Enabled** from the Options menu. To edit the image cropping settings, select **Crop Settings** from the Options menu. The Image Cropping window displays. Notice the crop lines around the image. These lines show the portion of the image that will be encoded. Use **Left**, **Top**, **Width**, and **Height** to adjust the size and location of crop lines.

2. If you need to edit the crop settings, select **Crop Settings** from the Options menu.

3. Click the **Start** button to start the encoding process. When file encoding is complete, an Encoding Complete message appears indicating the bit rate the file was encoded at.

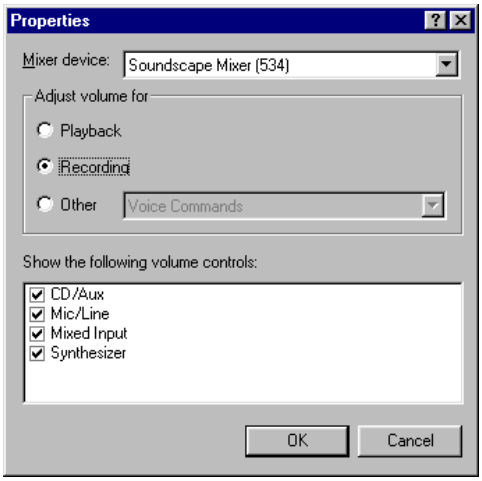
   If RealEncoder is unable to encode the file of the selected bit rate, you need to re-encode the file with a different template.

4. View the encoded file with RealPlayer.

5.7 Volume control

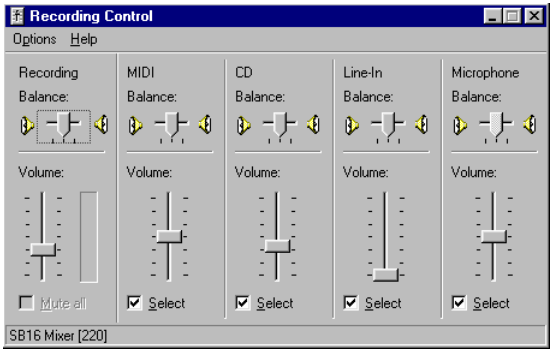
1. Select **Volume Control** from the Options menu. The Volume Control window displays.

2. Select **Properties** from the Options menu. The Properties window displays.



5. Click **Recording** to adjust the input recording volume. (Playback adjusts the level of the volume you hear while you are encoding, not the volume the end-user hears.)

6. Select from the list of volume controls the type of inputs you will be using and click **OK**. The Volume Control window will display the volume controls you select.



14. Select which recording inputs to use by clicking and checking the Select box for each input.

15. Adjust the sound level by moving the sliders up or down. Remember, if the volume is too high, the encoded sound may be clipped and appear distorted. If the volume is too low, it will be difficult to hear. Use the audio level meter in the RealEncoder window to monitor the level during encoding.

16. Close the Recording Control window and return to the RealEncoder.

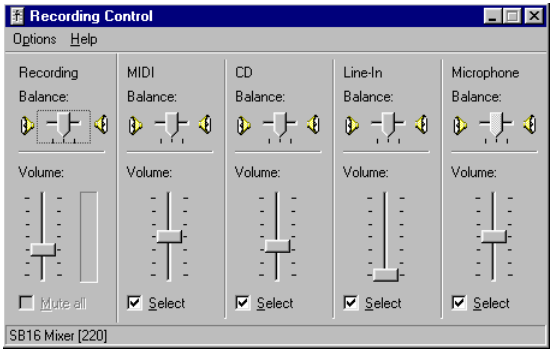
    Follow previous steps 10-16 only if the audio meter in the RealEncoder window indicates the input signal is too low.

17. In the properties pane, enter the Title, Author, and Copyright information for your output stream. These fields are optional. If you choose to provide this information, it will be displayed on the viewer's RealPlayer.

18. To allow RealPlayer Plus users to save your RealAudio or RealVideo content to disk, click **Selective Record**.

19. In the templates pane, select the template to encode the file. For more information on templates and creating your own templates , refer to "Tips and Tricks" in Chapter 5.

20. Click in the volume controls for the type of input you will be using and click **OK**. The Volume Control window displays with the volume controls you selected.



7. Click to place a check in the Select box for the type of input you will be using.

8. Adjust the sound level by moving the sliders up or down. Remember, if the volume is too high, the sound will clip and sound distorted. If the volume is too low, it will be difficult to hear. Use the audio level meter in the RealEncoder window to monitor the level during encoding.

9. Close the Recording Control window. The RealEncoder window displays.

10. Repeat steps 10-16 only if the audio meter indicates the input signal is too low.

5.8 Monitoring encoding statistics

You can monitor a variety of statistics while your RealAudio or RealVideo clip encodes. These include start and stop points, as well as audio and video bit rates, frame rates, motion quality and encoding speed settings. You can also monitor the output results of average bit rate, latency, frame rate, audio loss, and duration.

5.9 Editing your media files

Once created, RealAudio and RealVideo files (.rm) can be edited using the RMTools utility (rmtools exe). Operations include stream cutting, copying, and pasting. You can also edit Title, Author, and Copyright information. See the RealAudio and RealVideo Content Creation Guide for more information.

For more information

For more information about any of the topics in this manual, refer to the RealAudio and RealVideo Content Creation Guide, available at RealNetworks web site at **www.real.com**.

Other topics included in RealAudio and RealVideo Content Creation Guide are:

- RealEncoder installed files and file extensions
- command line encoding
- editing RealAudio and RealVideo
- command line editing
- image maps
- simulating a live broadcast
- synchronous multimedia
- configuring your web site